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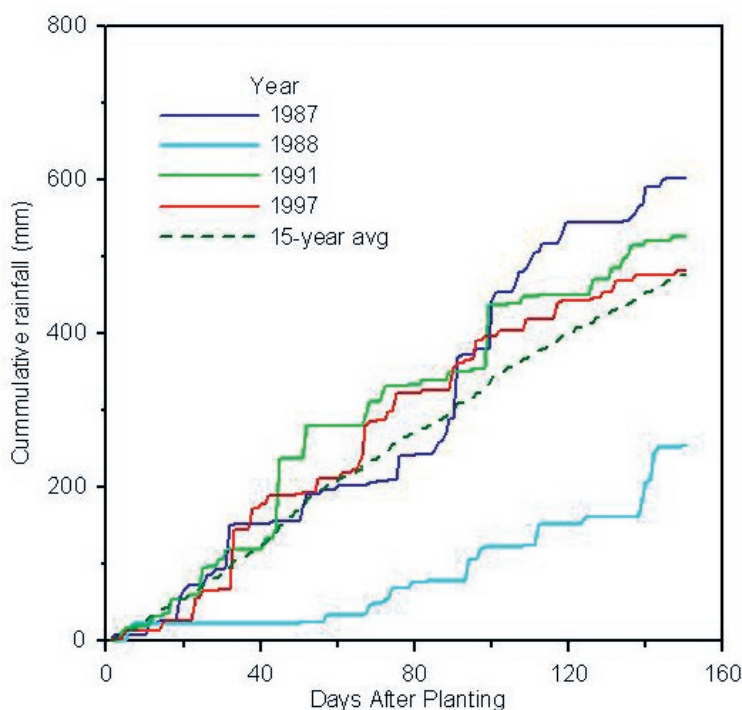
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# Conservation Systems Research

## *Impact of Irrigation on Long-Term Cotton Production and Soil Carbon in Conservation Systems*

### RESEARCH PROJECT DESCRIPTION NO. 42



Irrigation systems can aid in reducing the year to year variations in crop yields by compensating differences in rainfall.

### Researchers

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### The Challenge

Irrigation systems can be used to provide adequate water supply to crops, even in dry years. The purpose of irrigation is to reduce yield variability caused by differences in rainfall from year to year. However, proper irrigation scheduling can be a challenge. Soil and

crop management practices can have an influence on irrigation scheduling. Furthermore, since irrigation alters the natural moisture regime of the soil, it could change important soil properties. For example, soil organic matter content may change due from increased biomass production, residue accumulation, and microbial population and respiration. The challenge is to develop adequate irrigation scheduling under different management schemes and determine the long-term effect on productivity and soil carbon storage.

## The Experiment

Field work at the Auburn University's *Old Rotation*, in Auburn, Alabama, will:

- Evaluate the impact of irrigation on cotton production under different rotations and fertility scenarios.
- Determine the effect of long-term irrigation on carbon accumulation in soil.

This study will evaluate the impact of irrigation on cotton rotation and fertility,

*“... since irrigation alters the natural moisture regime of the soil, it could change important soil properties ... ”*

and soil carbon accumulation. The long-term rotations include: continuous cotton, cotton-winter legume, cotton-winter legume-corn-winter legume, and cotton-winter legume-corn-rye-soybean. Various levels of NPK fertilizer are incorporated in the study. Soil bulk density, water retention, water content, and organic matter will be determined periodically.

The work will be conducted at the *Old Rotation* (c. 1896) research site, which is the oldest continuous cotton experiment in the world and the third oldest field crop experiment on the same site in the United States. It was placed on the National Register of Historical Places in 1988. In 1996 conservation tillage was incorporated into the *Old Rotation* and since then, record breaking yields have been observed. In 2003, an irrigation system was installed to supply one-half of each of the long-term plots.



The *Old Rotation* experiment is the oldest continuous cotton experiment in the world, providing an invaluable opportunity to study long-term cotton production.